# Online education boosts proper use of drugs that prevent blood clots

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Results of a yearlong study funded by the Patient-Centered Outcomes Research Institute (PCORI) with more than 900 nurses at The Johns Hopkins Hospital suggest that well-designed online education can decrease the rate of nonadministration of prescribed and necessary doses of blood thinners to prevent potentially lethal blood clots in hospitalized patients.

The research was spurred by a documented need to boost administration of prescribed heparin and other blood thinners to prevent venous thromboembolism, and data showing that patients' refusal of the drugs frequently resulted in nurses' not giving them.

A report summarizing the study, published in *PLOS ONE*, on August 16, provides evidence that the online education was successful in giving nurses tools to communicate the serious need for the drugs to patients and improve rates of use.

"We teach in hopes of improving patient care, but there's actually very little evidence that online professional education can have a measurable impact. Our results show that it does," says Elliott Haut, M.D., Ph.D., associate professor and Vice Chair of Quality, Safety & Service, Department of Surgery, at the Johns Hopkins University School of Medicine and the paper's senior author.

Venous thromboembolism (VTE) is a blood clot that starts in a vein (often in a limb) and affects 350,000 to 600,000 people in the United

States each year. More than 100,000 people die from VTE annually, when a clot breaks off and travels to the lung—a total that is more than the number of lives taken by breast cancer, AIDS and motor vehicle collisions combined.

"While injectable blood-thinning drugs, such as heparin, can prevent VTE, upwards of 15 percent of prescribed doses are never administered to hospitalized patients, most often due to patient refusal," says Brandyn Lau, M.P.H., C.P.H., an assistant professor of surgery at the Johns Hopkins University School of Medicine and the paper's first author.

For the study, the team developed two online education modules about the importance of VTE prevention and tactics for better communicating its importance to patients. One module was "dynamic," involving a scenario-based experience in which nurses selected responses within given clinical scenarios, such as how to respond to a patient who was refusing a prophylactic medication dose. In the "static" arm, nurses were shown a PowerPoint slide show and with traditional voice-over explaining the information.

The investigators recruited 933 permanently employed nurses on 21 medical or surgical floors at The Johns Hopkins Hospital. Between April 1, 2014 and March 31, 2015, 445 randomly selected nurses on 11 of the floors took the dynamic education arm of the study; and 488 nurses on 10 floors were enrolled in the static arm.

To track nonadministration rates, the researchers retrieved data on VTE-preventing medication administration from the hospital's electronic health record system. The team collected data for one year and divided it into three time periods: baseline, education intervention and post-education. During the entire study period, 214,478 doses of blood clot-preventing medications were prescribed to patients on the 21 hospital floors.

After education, overall nonadministration rates were reduced from 12.4 percent to 11.1 percent. Nurses who completed the dynamic education module, however, saw a greater reduction in non-administration (10.8 percent to 9.2 percent) than those who completed the static education module (14.5 percent to 13.5 percent).

"Our study adds to evidence that the way something is taught to professionals has a great influence on whether they retain information and apply it," says Lau. "Active learning seems to get better results than passive learning, showing that it's not just what you teach, but also how you teach it."

"Now that we've shown the modules can be effective in improving practice, we want to make it available to the more than 3 million nurses practicing in the U.S.," Haut says.

At Johns Hopkins, it's available on the in-house MyLearning platform, and the plan is to make it mandatory across the entire Johns Hopkins Medicine system, Haut says.

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